

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Previously Presented) A cooling system for a portable computer comprising:

    a frame having a heat-source connecting unit contained within a first side and having a fan housing unit in a second side;

    a dissipating unit on one side of the fan housing unit of the frame that is configured to perform heat exchange;

    a dissipating fan within the fan housing unit configured to form an air stream that would pass through the dissipating unit from inside the fan housing unit; and

    a cooling unit coupled to the first side of the frame and configured to deliver heat from the heat-source connecting unit to the dissipating unit, wherein the cooling unit is a micro cooling unit configured to perform heat exchange using a cooling cycle caused by phase change, and wherein the micro cooling unit has an internal circulation loop that comprises,

        a liquid coolant moving block configured to return coolant to a beginning of a liquid phase transition block from an end of the liquid phase transition block, and

an insulation block between the liquid phase transition block and liquid coolant moving block.

2. Canceled

3. (Previously Presented) The system as claimed in claim 16, wherein the cooling unit is a plate-heat pipe that covers one side of the frame.

4. Canceled

5. (Previously Presented) The system as claimed in claim 16, wherein the cooling unit is plate-shape and approximately 1 mm thick.

6. (Original) The system as claimed in claim 1, wherein the heat source connecting unit is configured to thermally couple to a main board, and wherein when the frame is removed a processor mounted on the main board is exposed.

7. (Original) The cooling system as claimed in claim 1, wherein the frame and the cooling unit provide two heat removing paths to the dissipating unit.

8. (Currently Amended) A cooling system for use in a portable computer comprising:

Reply to Office Action of April 13, 2006

a dissipating plate having a dissipating fan in its one side and having a settle-down groove in its inside;

~~a settle unit coupled to a lower surface inside of the settle down groove in the dissipating plate;~~

a micro cooling system having a first side ~~coupled to an upper surface of~~ within the settle-down unit groove and a second opposite side configured to face a processor, wherein the micro cooling system is configured to perform heat exchange by repeating a cooling cycle of condensation and evaporation using a capillary phenomenon to transfer heat arising from the processor, wherein internally the micro cooling system comprises,

a liquid coolant storage block at one end,

a evaporation block having first size channels coupled to the liquid coolant storage block,

a gaseous coolant moving block coupled to the evaporation block, and

a condensation block having second channels larger than the first channels coupled to the gaseous coolant moving block.

9. (Original) The system of claim 8, wherein the dissipating plate is fastened to a main board in an inside of the portable computer.

10. (Previously Presented) The system of claim 9, wherein the dissipating plate is configured to removably provide access to a processor mounted on the main board

Reply to Office Action of April 13, 2006

comprising a coil spring that gives elastic force to a screw joining between the dissipating plate and the main board.

11. (Original) The system of claim 10, wherein the micro cooling system is thermally coupled to the processor when the dissipating plate is fastened to the main board, and wherein the micro cooling system adjacent to the processor is an identical material.

12. (Original) The system of claim 11, wherein the dissipating plate surrounds the processor to perform radiation cooling of an enclosed space.

13. Canceled

14. (Currently Amended) The system of claim 8, wherein the a settle unit in the settle-down groove and the micro cooling system are joined each other by brazing, and wherein a plurality of guide protuberances combine with the settle unit to position the processor.

15. (Previously Presented) The system of claim 8, wherein the micro cooling unit has a plurality of guides in a liquid coolant moving block, wherein first and second guides couple the liquid coolant moving block to the liquid coolant storage block and the liquid coolant condensation block.

16. (Currently Amended) A cooling system for a portable computer comprising:

a frame having a heat-source connecting unit ~~in a first side and having connected to a fan housing unit in a second side that has horizontal dimensions larger than the heat-source connecting unit at a connection point therebetween, wherein the heat-source connecting unit comprises,~~

~~at least two parallel projections extending from the fan housing unit connected by a third projection to form a recess, and~~

~~a plurality of joining bosses in the parallel projections, wherein an exposed surface of the joining bosses and projections extend in a plane with a prescribed height, and wherein the fan housing unit comprises,~~

~~frame forms \_\_\_\_\_ a bottom surface having an input port,~~

~~at least three and sides extending substantially vertically from the bottom surface of the fan housing unit to the prescribed height, and~~

~~an output port in one of said sides of the fan housing unit;~~

~~a dissipating unit on-adjacent said one side enclosing the output port of the fan housing unit of the frame that is configured to perform heat exchange;~~

~~a dissipating fan with in the fan housing unit configured to form an air stream that would pass through the dissipating unit from inside the fan housing unit; and~~

~~a plate-heat pipe coupled to covering one side of the frame to form a top surface of the fan housing unit that encloses a prescribed area determined by the bottom surface and the sides of the fan housing unit for contacting said air stream and to form a top surface of the heat source connecting unit that contacts the exposed surface of the~~

joining bosses and projections, wherein the plate-heat pipe overlaps a portion of the dissipating unit, and wherein the plate-heat pipe is configured to contact a heat source to deliver heat to the dissipating unit by circulating a fluid through its inside.

17. (Previously Presented) The system of claim 16, wherein the heat source connecting unit is configured to transfer heat from the heat source through the frame to the dissipating unit.

18. (Currently Amended) The system of claim 16, wherein the dissipating fan assembly is installed in a space partitioned by the fan housing unit and the plate-heat pipe and forms an-said air stream that collides against the plate-heat pipe and then the dissipating unit.

19. (Original) The system of claim 16, wherein the frame is fastened to a main board in the portable computer, wherein the dissipating unit is thermally coupled to a processor in the main board, and wherein the frame and the plate-heat pipe are configured to provide access to the processor.

20. (Original) The system of claim 16, wherein the plate-heat pipe is approximately 1.5 mm thick.

21. (Previously Presented) A cooling system for a portable computer comprising:

a frame having a recess in a first side and having a fan housing unit in a second side;

a micro cooling system having a first side configured with a heat releasing part contained within the frame by the recess and a second opposite side configured to include a heat absorption part, wherein the micro cooling system is configured to perform heat exchange by repeating a cooling cycle of condensation and evaporation using a capillary phenomenon to transfer heat arising from the processor.

a dissipating unit on one side of the fan housing unit of the frame that is configured to perform heat exchange;

a dissipating fan with the fan housing unit configured to form an air stream that would pass through the dissipating unit from inside the fan housing unit; and

a plate-heat pipe on one side of the frame and configured to deliver heat from the frame to the dissipating unit by circulating a fluid through its inside.

22. (Previously Presented) The cooling system of claim 21, wherein the micro cooling unit has first and second layers having different characteristics.

23. (Currently Amended) The system of claim 421, wherein internally the micro cooling system comprises:

a liquid coolant storage block at one end;

a evaporation block having first size channels coupled to the liquid coolant storage block;

a gaseous coolant moving block coupled to the evaporation block; and

a condensation block having second channels larger than the first channels coupled to the gaseous coolant moving block.

24. (Previously Presented) The system of claim 8, wherein at least a portion of the micro cooling system and the processor are integrally formed of the same material.

25. (New) The system of claim 1, wherein the liquid phase transition block comprises:

a liquid coolant storage block at one end;  
a evaporation block having first channels coupled to the liquid coolant storage block;  
a gaseous coolant moving block coupled to the evaporation block; and  
a condensation block having second channels coupled to the gaseous coolant moving block.

26. (New) The system of claim 25, wherein the first channels have a size smaller than the second channels.

27. (New) The cooling system of claim 25, wherein the liquid coolant storage block, the evaporation block and the gaseous coolant moving block of said micro cooling unit each has first and second layers having different characteristics, and wherein at least a portion of the micro cooling unit and a processor are integrally formed of the same material.

28. (New) The system of claim 1, wherein the insulation part includes gas or an insulating material.

29. (New) The system of claim 1, wherein the insulation part varies in size as it extends along the liquid coolant moving block.

30. (New) The system of claim 1, wherein said liquid phase transition block comprises a first fluid passage directly connecting evaporation and condensation blocks of the liquid phase transition block, wherein a cross-section of the first fluid passage increases between the evaporation and condensation blocks, wherein a cross-section of the first fluid passage increases in a first section configured to connect to the evaporation block and the cross-section of the first fluid passage is constant in a second section, and wherein the first fluid passage has a plurality of first guides forming channels extending along the first and second sections to separate flow of the coolant in a vapor state.

31. (New) The system of claim 1, wherein the micro cooling unit comprises:

    a first fluid passage coupled between evaporation and condensation blocks that has a plurality of first guides to separate flow of the coolant in a vapor state;

    a plurality of second guides configured to guide movement of a liquid state coolant from an output end of the liquid coolant moving block around the insulation block to a coolant reservoir; and

a plurality of third guides configured to guide movement of the liquid state coolant from the condensation block around the insulation block to an input end of the liquid coolant moving block, wherein the third guides are fewer in number than the second guides.